

**REMARKS**

Claims 1,2 and 5 through 21 are pending in the application. Claims 3 and 4 are cancelled.

Applicants note with appreciation that the Examiner has allowed claims 16 and 17, and has indicated that claims 4, 5, 13, 14, 20 and 21 would be allowable if rewritten in independent form. Rather than rewriting claim 4, Applicants opted to move the recital of claim 4 into claim 1. Applicants have rewritten claims 5, 13 and 20 into independent claim form. Thus, claims 1, 5, 13 and 20 are now an allowable independent claim. Claim 21 was amended to depend from claim 1 and thus claim 21 is allowable.

Claim 21 has been rejected under 35 U.S.C. 112 as having insufficient antecedent basis. Claim 21 is amended to obviate this rejection.

Claims 1, 7 through 12 and 15 have been rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 4,123,392 to Hall et al, hereinafter "Hall". Applicants have amended claim 1 to include a recital that was previously presented in claim 4, thus placing claim 1 in condition for allowance. Claims 7 through 12 and 15 are amended to depend from claim 6. Thus, applicants respectfully request withdrawal of the section 102(b) rejection of claims 1, 7 through 12, and 15.

Claims 6, 8 and 9 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Hall in view of U.S. Patent No. 6,517,743 to Anayama et al, hereinafter "Anayama". Claim 6 is amended to be an independent claim.

Independent claim 6 provides a radiation shielding arrangement for shielding neutron radiation and gamma radiation from particle accelerators, storage rings, target, experimental or analytical devices. The shielding arrangement is of a multilayer construction and includes at least a first layer and a second layer. The first layer is a spallation layer and the second layer is a neutron retarding layer.

Hall discloses a radiation shield with high hydrogen content (col. 3, lines 19-20). A non-combustible cement that forms the continuous phase of the finished shielding product, and hydrogen atoms in a suitable form are introduced as the discontinuous phase into the non-combustible cement (col. 3, lines 21-25). The Examiner admits, on page 5 of the Office Action, that Hall does not disclose that the shield has a multilayer construction.

Furthermore, Hall does not disclose a radiation shielding arrangement including "at least a first layer and a second layer," as recited in claim 6. Thus, Hall fails to disclose or suggest the elements of claim 6.

Anayama discloses a transparent shielding material for neutron shielding (col. 4, lines 13-17). The transparent shielding material can be molded as one body with the mold to have been adhered tightly each other, and a multi layered shielding material can be obtained (col. 4, lines 23-27).

However, Anayama does not disclose a multi-layer shielding arrangement where **a first layer is a spallation layer and a second layer is a neutron retarding layer**. Therefore, Anayama does not disclose a radiation shielding arrangement including "at least a first layer and a second layer, wherein said first layer is a spallation layer and said second layer is a neutron retarding layer," as recited in claim 6. Thus, Anayama fails to disclose or suggest the elements of claim 6.

Since Hall fails to disclose a multilayer shielding arrangement, and Anayama fails to disclose a multilayer shielding arrangement including a spallation layer and a neutron retarding layer, Hall and Anayama, whether considered independently or in combination with one another, clearly fail to disclose all of the elements of claim 6. Therefore, claim 6 is patentable over the cited combination of Hall and Anayama.

Claims 8 and 9 are amended to depend from claim 6. For at least the reasoning

provided in support of claim 6, claims 8 and 9 are also patentable over the cited combination of Hall and Anayama.

For the reasons set forth above, the rejection of claims 6, 8 and 9 under 35 U.S.C. 103(a) as being unpatentable over Hall in view of Anayama is overcome. Thus, applicants respectfully request that the rejection of claims 6, 8 and 9 be reconsidered and withdrawn.

Claims 2, 3 and 19 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Hall in view of U.S. Patent No. 3,453,160 to Darling et al, hereinafter "Darling". Applicant respectfully traverses this rejection. Claim 2 depends from now allowable claim 1, and is thus allowable. Claim 3 is now cancelled.

Independent claim 19 provides a use of a shielding element that contains gypsum for shielding radiation from a device selected from the group consisting of a particle accelerator, a particle storage ring, a target device, an experimental device and an analytical device. The shielding element has a thickness of at least 2 m.

Hall discloses a radiation shield with high hydrogen content (col. 3, lines 19-20). A non-combustible cement that forms the continuous phase of the finished shielding product, and hydrogen atoms in a suitable form are introduced as the discontinuous phase into the non-combustible cement (col. 3, lines 21-25). The Examiner admits, on page 6 of the Office Action, that Hall does not disclose a shielding material containing gypsum.

Therefore, Hall does not disclose "a uses of a shielding element that contains gypsum for shielding radiation device . . . wherein said shielding element has a thickness of at least 2 m" as recited in claim 19. Thus, Hall fails to disclose or suggest the elements of claim 19.

Darling discloses a radiation shielding structure including gypsum and boron material (col. 1, lines 39-44). Darling also discloses that it is preferred to form the shielding structure into boards of one-half inch thickness, and to install the boards to form a two-inch thick lining (col. 3, lines 59-71).

However, Darling does not disclose a shielding element including gypsum that has a **thickness of at least 2 m**. Therefore, Darling does not disclose a use of a shielding element, "wherein said shielding element has a thickness of at least 2 m," as recited in claim 19. Thus, Darling fails to disclose or suggest the elements of claim 19.

Since Hall fails to disclose a shielding element containing gypsum and having a thickness of at least 2 m, and Darling fails to disclose a shielding element having a thickness of at least 2 m, Hall and Darling, whether considered independently or in combination with one another, clearly fail to disclose all of the elements of claim 19. Therefore, claim 19 is patentable over the cited combination of Hall and Darling.

For the reasons set forth above, the rejection of claims 2, 3 and 19 under 35 U.S.C. 103(a) as being unpatentable over Hall in view of Darling is overcome. Thus, applicants respectfully request that the rejection of claims 2, 3 and 19 be reconsidered and withdrawn.

Claim 18 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Hall in view of Darling, and further in view of Japanese Patent Application No. 11202090 A to Onoda Cement Co., hereinafter "Onada", Kovacs et al, Rocnik 7, 2002, vol. 3, pgs. 156-160, hereinafter "Kovacs", and GPDA brochure No. 2, July 1997, pgs. 1-8, hereinafter "GPDA".

Independent claim 18 provides a use of gypsum from flue gas desulphurization plants for producing a radiation shielding arrangement for shielding neutron radiation and gamma radiation from high-energy particle accelerators, storage rings, target, experimental or analytical devices. The gypsum is used as a neutron retarding material.

Hall discloses a radiation shield with high hydrogen content (col. 3, lines 19-20). The Examiner admits, on page 6 of the Office Action, that Hall does not disclose a shielding material containing gypsum.

Darling discloses a radiation shielding structure including gypsum and boron material (col. 1, lines 39-44). The Examiner admits, on page 6 of the Office Action, that Darling does not disclose the use of gypsum from flue gas desulphurization plants.

Onada discloses the use of material from one or more of city waste incineration ash and sewage sludge incineration ash for the production of a neutron shield body. Kovacs discloses that, in coal-fired power plants, and in the case of flue gas desulphurization, REA gypsum is produced (page 156, lines 1-3). GPDA also discloses that gypsum can be obtained from flue gas desulphurization (page 4, col. 2, lines 1-8).

However, none of the above references, i.e. Hall, Darling, Onada, Kovacs and GPDA, disclose the use of gypsum from flue gas desulphurization plants **as a neutron retarding material**. Therefore, none of the above references disclose "a use of gypsum from flue gas desulphurization plants for producing a radiation shielding arrangement . . . wherein said gypsum is used as a neutron retarding material," as recited in claim 18.

Thus, Hall, Darling, Onada, Kovacs and GPDA, whether considered independently or in combination with one another, fail to disclose all of the elements of claim 18. Therefore, claim 18 is patentable over the cited combination of Hall, Darling, Onada, Kovacs and GPDA.

For the reasons set forth above, the rejection of claim 18 under 35 U.S.C. 103(a) as being unpatentable over Hall in view of Darling, and further in view of Onada, Kovacs and GPDA, is overcome. Thus, applicants respectfully request that the rejection of claim 18 be reconsidered and withdrawn.

An indication of the allowability of all pending claims by issuance of a Notice of Allowability is earnestly solicited.

Respectfully submitted,

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